Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

1. (currently amended) An optical information recording medium, comprising:

a transparent substrate having one of concentric-circle guide grooves and a spiral guide groove; and

a phase-change recording layer, on the transparent substrate, which generates a phase-change by being exposed to a laser beam which emission is controlled at where recording marks and spaces between the recording marks both having duration "nT", in which "n" expresses nonnegative integer, and "T" expresses a reference clock period, are to be marked, using Pulse Width Modulation, so as to record, erase, and rewrite information,

wherein the optical information recording medium has recording conditional information pre-formatted thereon, which includes parameters of a plurality of multipulse patterns having different applied linear velocity ranges and information regarding linear velocities capable of recording with each of the multipulse patterns,

wherein the parameters of each multipulse pattern included in the recording conditional information include an optimum pulse width of the multipulse pattern for each of said linear velocities indicated in the recording conditional information of the multipulse pattern, and

the multipulse patterns are combinations of a heating pulse and a cooling pulse, which specify a light emission waveform of the laser beam, and

wherein one of the multipulse patterns is a 1T cycle pattern including a first front-pulse part, a first end-pulse part and a first multipulse part where the combination of one ~~portion of~~

~~the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the first multipulse part is set as a 1T cycle, and another one of the multipulse patterns is a 2T cycle pattern including a second front-pulse part, a second end-pulse part and a second multipulse part where the combination of one ~~portion of the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the second multipulse part is set as a 2T cycle, and

wherein each multipulse pattern includes a multipulse part that is preceded by a front-pulse part and followed by an end-pulse part.

2. (original) An optical information recording medium according to claim 1, wherein the recording conditional information further includes parameters of test recording corresponding to each of the multipulse patterns.

Claim 3 (canceled).

4. (previously presented) An optical information recording medium according to claim 3, wherein the 1T cycle pattern is a pattern of which the applied linear velocity range is fixed to a specific linear velocity.

5. (original) An optical information recording medium according to claim 1, wherein the recording conditional information is encoded with a wobble of the guide grove.

6. (original) An optical information recording medium according to claim 5, wherein the recording conditional information is encoded using a frequency modulation of the wobble.

7. (original) An optical information recording medium according to claim 5, wherein the recording conditional information is encoded using a phase modulation of the wobble.

8. (original) An optical information recording medium according to claim 5, wherein the recording conditional information is encoded in a lead-in area on the optical information recording medium.

9. (original) An optical information recording medium according to claim 5, wherein the recording conditional information is encoded in one of a part on inner radius side of an information recording area and a part on inner radius side of a test recording area, on the optical information recording medium.

10. (original) An optical information recording medium according to claim 5, wherein the recording conditional information is encoded in one of a part on outer radius side of a information recording area and outer radius side of a lead-out area, and a part on outer radius side of a outer peripheral part of a test recording area, on the optical information recording medium.

11. (original) An optical information recording medium according to claim 1, wherein the recording conditional information is encoded in a part of an information recording area, on the optical information recording medium.

12. (original) An optical information recording medium according to claim 1, wherein the recording conditional information is written as code in a part of a surface of the optical information recording medium.

13. (currently amended) A method for determining a recording condition, comprising the steps of:

reading pre-formatted recording conditional information, which includes parameters of a plurality of multipulse patterns having different applied linear velocity ranges and information regarding linear velocities capable of recording using the multipulse patterns, from an optical information recording medium loaded in an optical information recording apparatus;

comparing the pre-formatted recording conditional information on the optical information recording medium with recording conditional information of the optical information recording apparatus regarding performances including recordable linear velocity;

selecting a recording conditional information satisfying a desired optimum condition based on the result of comparing; and

generating a multipulse pattern used for specifying a light emission waveform of a laser beam, based on the selected recording conditional information,

wherein the optical information recording medium, comprises:

a transparent substrate having one of concentric-circle guide grooves and a spiral guide groove; and

a phase-change recording layer, on the transparent substrate, capable of generating a phase-change by being exposed to the laser beam which emission is controlled where recording marks and spaces between the recording marks both having duration "nT", in which "n"

expresses nonnegative integer, and "T" expresses a reference clock period, are to be marked, using Pulse Width Modulation, so as to record, erase, and rewrite information,

wherein the parameters of each multipulse pattern included in the recording conditional information include an optimum pulse width of the multipulse pattern for each of said linear velocities indicated in the recording conditional information for the multipulse pattern, and the multipulse patterns are combinations of a heating pulse and a cooling pulse, and

wherein one of the multipulse patterns is a 1T cycle pattern including a first front-pulse part, a first end-pulse part and a first multipulse part where the combination of one ~~portion the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the first multipulse part is set as a 1T cycle, and another one of the multipulse patterns is a 2T cycle pattern including a second front-pulse part, a second end-pulse part and a second multipulse part where the combination of one ~~portion of the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the second multipulse part is set as a 2T cycle, and

wherein each multipulse pattern includes a multipulse part that is preceded by a front-pulse part and followed by an end-pulse part.

14. (original) A method for determining a recording condition according to claim 13, further comprising the step of: performing a test recording onto the optical information recording medium based on parameters of the test recording, which is also pre-formatted as the recording conditional information, corresponding to the generated multipulse pattern, so as to determine emission power of the heating pulse in accordance with the result thereof.

15. (original) A method for determining recording condition according to claim 14,

further comprising the step of: performing a test recording onto a test recording area of the optical information recording medium based on the selected recording conditional information so as to make a final determination of a desired optimum condition in accordance with propriety of signal characteristics of resulted recording marks.

16. (previously presented) A method for determining a recording condition according to claim 13, wherein the desired optimum condition is a condition realizing the highest linear velocity among recordable conditions selected based on the result of comparing.

17. (previously presented) A method for determining a recording condition according to claim 13, wherein the desired optimum condition is a condition realizing the highest linear velocity among recordable conditions selected based on the result of comparing, with a specific multipulse pattern.

18. (previously presented) A method for determining a recording condition according to claim 13, wherein the desired optimum condition is any recordable condition selected based on the result of comparing, with a specific linear velocity.

19. (original) A method for determining a recording condition according to claim 13, wherein the desired optimum condition is a condition realizing the highest stability among recordable conditions selected based on the result of comparing.

20. (currently amended) An optical information recording apparatus, comprising:

a rotation controller configured to rotate an optical information recording medium disposed thereon;

a light source configured to irradiate a laser beam to the optical information recording medium;

a light source driver configured to induce an emission of the light source;

a reader configured to read pre-formatted recording conditional information from the optical recording information medium;

a comparing mechanism configured to compare the pre-formatted recording conditional information, with recording conditional information of the optical recording information apparatus regarding performances including recordable linear velocity;

a selecting mechanism configured to select a recording conditional information satisfying a desired optimum condition based on the result of comparing by the comparing mechanism;

a pulse pattern generator configured to generate a multipulse pattern used for an emission of the light source, based on the selected recording conditional information;

an emission waveform controller configured to set a recording strategy which determines a light emission waveform of the laser beam based on the generated multipulse pattern by the pulse pattern generator, and to control the light source driver by the recording strategy; and

a speed controller configured to control a relative sweep speed between the optical information recording medium rotated by the rotation controller and the laser beam irradiated to the optical information recording medium, based on linear velocity of the recording conditional information selected by the selecting mechanism,

wherein the optical information recording apparatus records information onto the optical information recording medium by irradiating the laser beam in accordance with Pulse Width

Modulation in which duration of a recording mark is expressed by "nT" which is "n" times of a basis clock period "T", where "n" expresses nonnegative integer,

wherein the parameters of each multipulse pattern included in the recording conditional information include an optimum pulse width of the multipulse pattern for each of said linear velocities indicated in the recording conditional information for the multipulse pattern, and

wherein one of the multipulse patterns is a 1T cycle pattern including a first front-pulse part, a first end-pulse part and a first multipulse part where the combination of one ~~portion of the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the first multipulse part is set as a 1T cycle, and another one of the multipulse patterns is a 2T cycle pattern including a second front-pulse part, a second end-pulse part and a second multipulse part where the combination of one ~~portion of the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the second multipulse part is set as a 2T cycle, and

wherein each multipulse pattern includes a multipulse part that is preceded by a front-pulse part and followed by an end-pulse part.

21. (original) An optical information recording apparatus according to claim 20, further comprising a test recording mechanism configured to perform a test recording to the optical information recording medium based on parameters of the test recording, which is also pre-formatted on the optical information recording medium as the recording conditional information, corresponding to a multipulse pattern of the selected recording conditional information by the selected mechanism, so as to determine a light emission power of the heating pulse.

22. (original) An optical information recording apparatus according to claim 21, further

comprising: a final determination mechanism configured to finally determine a desired optimum condition based on propriety of signal characteristic of resulted recording marks by the test recording mechanism.

23. (previously presented) An optical information recording apparatus according to claim 22, wherein the desired optimum condition is a condition realizing the highest linear velocity among recordable conditions based on the result of comparing by the comparing mechanism.

24. (previously presented) An optical information recording apparatus according to claim 22, wherein the desired optimum condition is a condition realizing the highest linear velocity among recordable conditions based on the result of comparing by the comparing mechanism, with a specific multipulse pattern.

25. (previously presented) An optical information recording apparatus according to claim 22, wherein the desired optimum condition is any recordable condition selected based on the result of comparing by the comparing mechanism, with a specific linear velocity.

26. (original) An optical information recording apparatus according to claim 22, wherein the desired optimum condition is a condition realizing the highest stability among recordable conditions selected based on the result of comparing by the comparing mechanism.

27. (currently amended) An information processing apparatus, comprising:

an optical information recording apparatus, wherein the optical information recording apparatus, comprises:

a rotation controller configured to rotate an optical information recording medium disposed thereon;

a light source configured to irradiate a laser beam to the optical information recording medium;

a light source driver configured to induce an emission of the light source;

a reader configured to read pre-formatted recording conditional information from the optical recording information medium;

a comparing mechanism configured to compare the pre-formatted read recording conditional information, with recording conditional information of the optical recording information apparatus regarding performances including recordable linear velocity;

a selecting mechanism configured to select a recording conditional information satisfying a desired optimum condition based on the result of comparing by the comparing mechanism,

a pulse pattern generator configured to generate a multipulse pattern used for an emission of the light source, based on the selected recording conditional information;

an emission waveform controller configured to set a recording strategy which determines a light emission waveform of the laser beam based on the generated multipulse pattern by the pulse pattern generator, and to control the light source driver by the recording strategy; and

a speed controller configured to control a relative sweep speed between the optical information recording medium rotated by the rotation controller and the laser beam irradiated to

the optical information recording medium, based on linear velocity of the recording conditional information selected by the selecting mechanism,

wherein the optical information recording apparatus records information onto the optical information recording medium by irradiating the laser beam in accordance with Pulse Width Modulation in which duration of a recording mark is expressed by "nT" which is "n" times of a basis clock period "T", where "n" expresses nonnegative integer,

wherein the parameters of each multipulse pattern included in the recording conditional information include an optimum pulse width of the multipulse pattern for each of said linear velocities indicated in the recording conditional information for the multipulse pattern, and

wherein one of the multipulse patterns is a 1T cycle pattern including a first front-pulse part, a first end-pulse part and a first multipulse part where the combination of one ~~portion of the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the first multipulse part is set as a 1T cycle, and another one of the multipulse patterns is a 2T cycle pattern including a second front-pulse part, a second end-pulse part and a second multipulse part where the combination of one ~~portion of the~~ heating pulse and one ~~portion of the~~ cooling pulse [[for]] of the second multipulse part is set as a 2T cycle, and

wherein each multipulse pattern includes a multipulse part that is preceded by a front-pulse part and followed by an end-pulse part.

28. (previously presented) An optical information recording medium according to claim 1, wherein said pre-formatted recording conditional information includes a first linear velocity range for a 1T cycle pattern and a second linear velocity range for a 2T cycle pattern.

29. (previously presented) An optical information recording medium according to claim 1, wherein said pre-formatted recording conditional information includes a first set of parameters for a 1T cycle pattern and a second set of parameters for a 2T cycle pattern.